EdGCM Educational Global Climate Modeling Project of Columbia University

Demonstration of the EdGCM and EZgcm Climate Modeling Software

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This session will demonstrate the Educational Global Climate Modeling software, EdGCM, as well as a new web-based tool, EZgcm, that is under development as part of NASA's Innovations in Climate Education program (NICE). The demonstration does not require that software be installed, but interested parties can download a demo copy of the EdGCM software in advance at:

http://edgcm.columbia.edu/download-edgcm

The goal of the EdGCM Project is to help teachers and students learn about climate change and climate modeling by giving them the ability to perform genuine NASA global climate model (GCM) experiments on desktop and laptop computers. As such, EdGCM is an ideal tool for helping educators meet the challenge of producing climate change-aware young adults. EdGCM has already been adopted at many undergraduate institutions in the U.S. and abroad. As part of NASA's Innovations in Climate Education program, EdGCM is being used in support of both formal and informal education, and has been a centerpiece for numerous professional development programs. It is expected to be of increasing interest to teachers in grades 6-12, as science education standards expand the emphasize on climate science, modeling, computer simulation and research into STEM curricula.

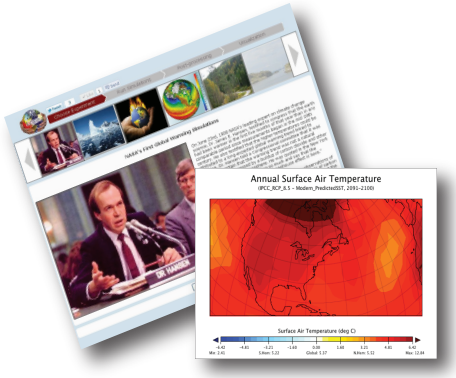
To broaden the appeal of climate science and modeling activities – especially to the middle school and high school grade levels – we have been developing a new web-based climate modeling tool called "EZgcm." The concept of EZgcm is to place greater emphasis on teaching students the steps involved in the climate modeling process, with less focus on the myriad details involved in GCM setup, operation and post-processing of raw output. These steps are still addressed, but the streamlined approach allows teachers to clarify for students the role of the scientific process in climate change studies. In addition, EZgcm will place greater emphasis on new ways of communicating the results of climate modeling studies by harnessing the power of social media.

Students As Climate Scientists

EdGCM and EZgcm both permit students to reproduce the scientific process from a climate modeler's point-of-view, guiding students through the following steps:

- Designing climate model experiments
- Setting up and running computer climate model simulations
- Post-processing the raw output of those simulations
- Using scientific visualization to aid analysis, interpretation, and presentation
- Communicating scientific results and conclusions

The primary difference between EdGCM and EZgcm is that with the latter, users will be asked to select a project from a website containing "Rediscovery Experiments." These are scientific climate modeling studies that address everything from fundamental climate science problems to world-famous research studies conducted by NASA, NOAA, NSF, and the Intergovernmental Panel on Climate Change (IPCC). Although the required simulations have already been pre-computed (saving two days to two weeks' computing time), users are asked to walk through the same scientific process as they would in EdGCM. Analysis and reporting of the climate model results remains the job of the teacher/student partnership, and can be tailored to the curriculum.



As a bonus, EdGCM and EZgcm projects encourage users to make up their own minds based on the results of their own work. This helps demystify the climate change issue and greatly reduces skepticism by not obliging them to accept argument from authority alone.

Many of the "Rediscovery Experiment" materials created for EZgcm will be adaptable for use with EdGCM, either as introductory investigations that can be used as a springboard to more in-depth analyses, or as a motivator for students to develop customized EdGCM experiments they run themselves. In this way, EZgcm becomes a stepping stone to higher-level STEM activities.

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